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## Full Length Article

# Supply chain solutions to improve the distribution of antiretroviral drugs (ARVs) to clinics in rural areas: A case study of the QwaQwa district



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## ABSTRACT

This article serves as a case study based on research that was performed in the QwaQwa district in the Free State Province where the distribution of ARVs to the regional Manapo hospital, as well as between the hospital and its peripheral clinics, was interrupted and inconsistent due to problems in the supply chain. An unreliable and interrupted ARV supply chain creates the risk of virus reactivation and eventual patient mortality.

The objectives of the study were to explore the problems experienced with the ARV distribution practices at the Manapo hospital, and to recommend ways in which the distribution of ARVs can be improved so that patients can receive an uninterrupted supply. The nature of the topic researched dictated the use of mainly the quantitative research method.

The main problems identified include: Wrong and no uniform practice of ordering stock by the hospital and the clinics; lack of reliable, structured transportation from the depot to the hospital; as well as poor inventory management and poor overall communication. Recommendations to address the problems include: Implementing a supply chain planning and design process; improving inventory management and warehousing practices; implementing more effective and reliable distribution and transportation processes; as well as improving supply chain coordination and overall communication.

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## 1. Introduction

Research has shown that people living with the Human Immunodeficiency Virus (HIV) and the Acquired Immunodeficiency Syndrome (AIDS) can lead normal and healthy lives on condition that they receive their antiretroviral medication (ARVs) on a continuous, uninterrupted basis (Rang, Dale, Ritter, & Moore, 2003, pp. 657, 659–650; Sande & Volberding, 1999, p. 97). With uninterrupted Antiretroviral Treatment (ART) the level of HIV in an infected person's body is kept at minimum levels; any further weakening of the immune system is stopped; the virus can become dormant; and the lives of HIV and AIDS infected persons prolonged (Schouten, 2011, p. 1).

However, the treatment of HIV and AIDS is life-long and, once initiated, it is imperative for patients to obtain an uninterrupted monthly supply of their ARVs from health facilities such as hospitals and clinics so that their medication can be taken on a daily basis for the rest of the person's life. When the use of the ARVs is interrupted there is a potential risk of virus reactivation. Unfortunately, the supply of ARVs to hospitals and clinics is often interrupted due to unreliable, ineffective (not at satisfactory levels) and inefficient (too costly) procurement and distribution systems, which results in high levels of morbidity and mortality (Management Sciences for Health, 2006, p. 228). In a study undertaken by Mori and Owenya (2014, p. 1) on ARV distribution in Tanzania, they found that stock-outs of ARVs due to inefficient supply systems, quantification problems and short expiry duration, caused patients to change their ART regimens, thereby increasing the risk of the emergence of drug-resistant HIV strains. According to Nsimba and Irundi (2010, p. 14), medication non-adherence has been associated with increased secondary bacterial and parasite resistance in Sub-Saharan African countries.

This article is part of a study that was performed in the QwaQwa district in the Free State Province. Here the distribution of ARVs to the regional Mofumahadi Manapo Mopeli Regional hospital (Manapo hospital for short), as well as between the hospital and its peripheral clinics, was interrupted and inconsistent due to problems in the supply chain, making Highly Active Antiretroviral Treatment (HAART) very difficult. With the hospital not receiving its ordered quantities on time, it failed to provide clinics with an uninterrupted supply of ARVs. This resulted in patients experiencing adherence problems, often causing treatment failure (death). This interrupted and inconsistent supply of ARVs to patients due to supply chain problems, is the research problem that was addressed in this study. Therefore, the research question is the following: What are the reasons for the interrupted and inconsistent supply of ARVs from the hospital and clinics to the patients?

## 2. Purpose of the article

The purpose of the article is to explore the effectiveness (whether patients are well served) and efficiency (at the lowest possible cost) of the supply of ARVs between the pharmaceutical warehouses/depots, the hospital and the clinics.

## 3. Objectives of the article

Based on the research problem and the research question indicated above, the objectives of this article, similar to the objectives of the study on which it is based, are the following:

- 3.1. To explore and describe the supply chain problems experienced with the ARV distribution practices at the Manapo hospital.
- 3.2. To recommend ways in which the distribution of ARVs can be done more effectively and efficiently at the hospital, in the district, in rural areas, and the country at large, so that patients can receive an uninterrupted supply of ARVs.

## 4. ARV treatment in practice

In November 2003, the South African government, through the document called the Operational Plan for Comprehensive HIV and AIDS Care, Management and Treatment (OPCCMT), initiated the supply of ARVs through public health facilities to HIV patients as part of the Comprehensive Care, Management and Treatment (CCMT) programme (National Department of Health (NDoH) (2003), pp. 13–14, 17).

Based on the document and in terms of current policy, the provincial departments of health, on the conclusion of open tenders, appoint the successful bidders as contractors who are responsible for procuring ARVs from the manufacturers and supplying these to provincial regional pharmaceutical warehouses/depots (pharmaceutical warehouses for short). The manufacturer maintains a warehouse from which orders are dispatched to the pharmaceutical warehouses according to a prescribed requisition procedure (see Fig. 1). Each hospital is allocated a budget which is used to order its required quantities of ARVs from these pharmaceutical warehouses.

The pharmaceutical warehouse, on request, distributes the medication to the local hospitals where the bulk medications are made up into pre-packed monthly packages for further distribution to the clinics in the region. A hospital such as the Manapo hospital would thus order ARVs from the nearby pharmaceutical warehouse, and have these transported to and stored at the hospital. From the hospital the drugs are distributed to various peripheral clinics for easy access by patients. The release of these medications to the clinics follows a requisition procedure in which each clinic will request a specified number of packages according to the number of patients requiring the medication.

This is a relatively simple process for chronic medications where the demand is likely to be fairly constant, for example, ARVs, anti-hypertensive drugs and anti-epileptic drugs. A small excess will be maintained in case any new patients are enrolled at the clinic. Certain medications will be ordered according to the specific procedure with due cognisance of available supplies, for example, antibiotics, analgesics and cold medications.

When HIV patients are initiated onto ARV treatment at hospitals and clinics, they are issued with their first month's

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